Nov. 10, 1931. W. W. LASKER, JR 1,831,359

MARKING DEVICE

Filed June 8, 1928 2 Sheets-Sheet 1

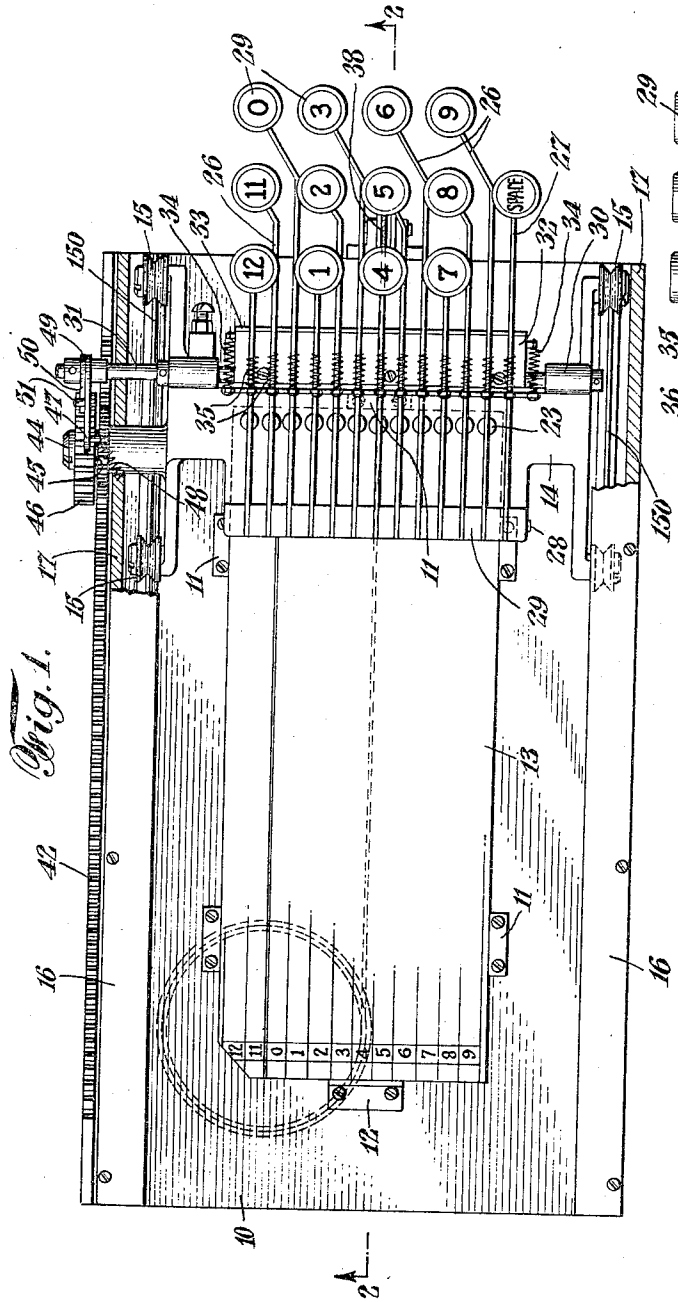


Fig. 1.

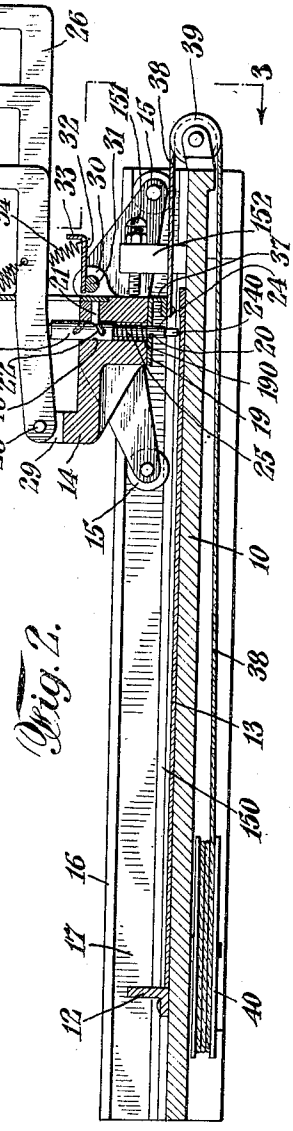


Fig. 2.

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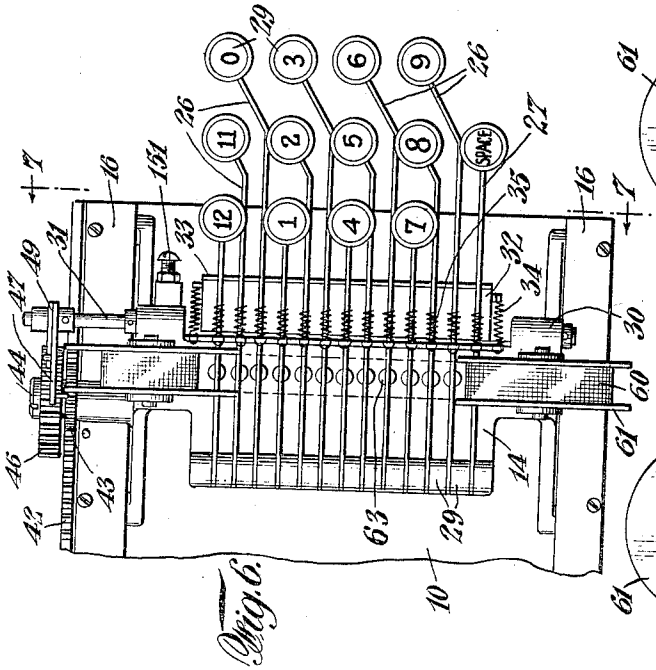


Fig. 6.

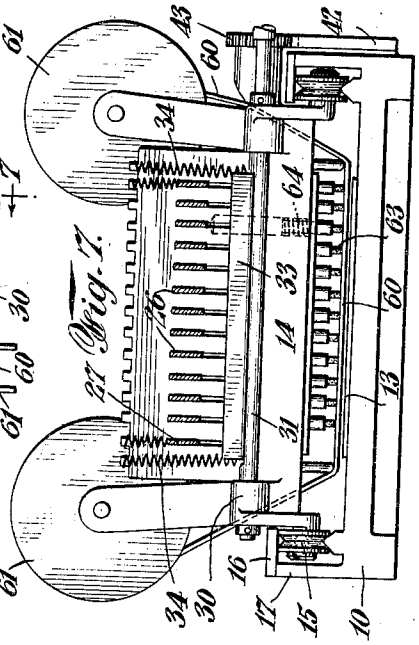


Fig. 7.

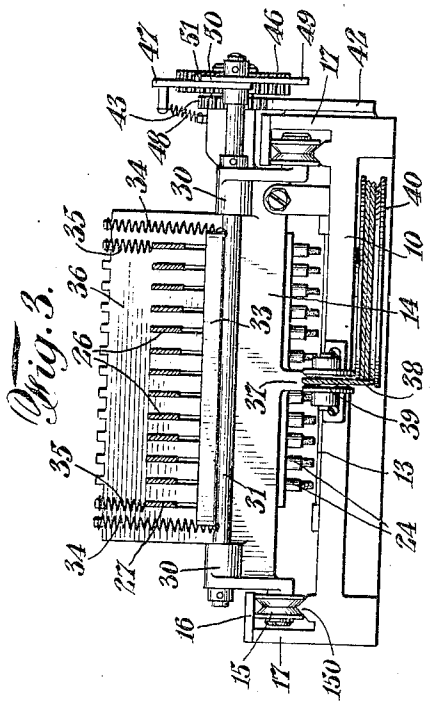


Fig. 3.

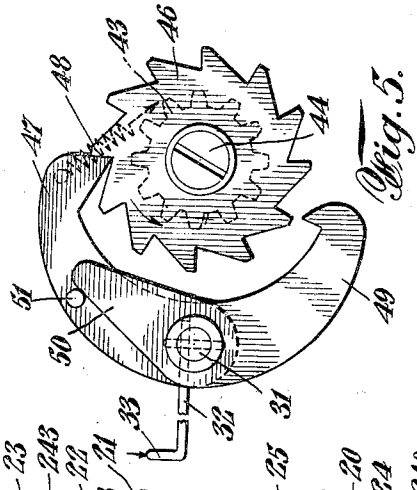


Fig. 5.

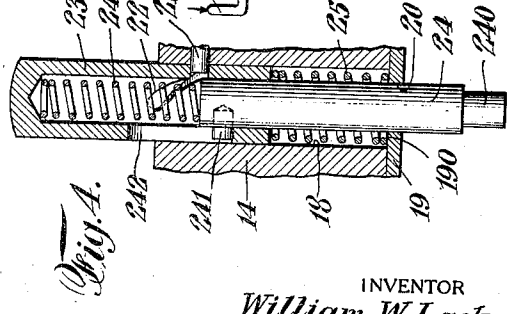


Fig. 4.

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Patented Nov. 10, 1931 1,831,359

UNITED STATES PATENT OFFICE

WILLIAM W. LASKER, JR., OF BROOKLYN, NEW YORK

MARKING DEVICE

Application filed June 8, 1928. Serial No. 283,885.

This invention relates to marking devices, and particularly to marking devices for depositing electrical conducting material on cards, or other documents for indicating data on such documents. Documents of the type to which I refer are made the subject matter of my issued Letters Patent 1,567,325, issued December 29, 1925, and one form of marking device is shown in my issued Letters Patent 1,573,174, issued February 16, 1926.

The main object of the present invention is to produce a marking device controlled by keys or manipulative members for applying the spots or marks of electrical conducting material to the documents.

Another object is to produce a device of this type in which the card and marking instrumentalities are moved relatively to each other so as to automatically bring different columns or zones of the card into marking relation with the marking instrumentalities.

Another object is to produce a device of this type which shall be simple of construction, cheap to manufacture, and highly efficient for the purpose for which it is designed.

With these and other objects in view, which will become apparent as the specification proceeds, the invention resides in certain novel construction and combination of parts hereinafter fully described and specifically pointed out in the appended claims. The means for accomplishing all of these objects is illustrated in the accompanying drawings, in which:

Fig. 1 is a top plan view of one embodiment of my invention.

Fig. 2 is a vertical sectional view substantially on line 2—2 of Fig. 1.

Fig. 3 is a vertical, transverse section on line 3—3, Fig. 2.

Fig. 4 is an enlarged sectional detail view of one of the marking instrumentalities.

Fig. 5 is an enlarged detail view of the escapement stop mechanism.

Fig. 6 is a fragmentary top plan view of a second embodiment of my invention.

Fig. 7 is a vertical sectional view taken substantially on line 7—7 of Fig. 6.

Like characters of reference refer to like parts in all views.

Referring to the drawings in detail, 10 represents the base of the machine, which may be of any suitable material and shape to support the working parts of the machine. To this base are secured suitable side and end document guides 11 and 12 which may be made adjustable if desired so as to accommodate several sizes of documents. A card 13 is shown in Fig. 1 as held by these guides in position for depositing thereon the electrical conducting material. The usual data card is shown, having its face divided into columns, each column bearing indicia running from "0" to "12", altho, of course, the card may have more or less or different indicia on it; and the document itself may be either a card or any other suitable data receiving element.

A carriage frame 14 which may be a casting, and is so shown, is mounted on wheels or rollers 15 and rides on rails 150 formed on or secured to the base 10 and is held down by guide rails 16 removably secured to the side walls 17 of the base 10. The carriage is therefore movable over the card 13. The carriage may be limited in its movement by the card stop 12 at the left of the machine as seen in Fig. 2, or by other suitable limiting means. The extent of movement of the carriage toward the right may be limited by an adjustable screw 151 mounted in a lug 152 on the base plate 10, as seen in Fig. 2. The carriage frame 14 is provided with a plurality of wells or countersinks 18. A plate 19 is secured to the carriage frame and pierced by apertures 20 which are smaller than and concentric with the bottoms of countersinks 18, as shown in Fig. 2, so as to form shoulders or spring seats 190.

Mounted in each of the countersinks 18 is a marking device somewhat similar to the individual device shown in my Patent No. 1,573,174, and shown in detail in Fig. 4. Mounted in the carriage frame 14 and extending into each countersink 18 is a respective pin 21, the inner end of such pin 21 extending into a spiral slot 22 in a respective holder 23. The upper end of each holder 23 is positioned under a respective key lever 26 and is adapted to be depressed thereby.

Respective springs 25 tend constantly to force their holders 23 to their uppermost position. Mounted in each holder 23 is a carrier bar 24 which carries electrical conducting material 240. A pin 241 is secured in each carrier 24 and extends into a vertical slot 242 in the respective holder 23. A spring 243 tends constantly to hold the carrier in its extruded position with relation to holder 23.

It will now be seen that normally the holders 23 are held by springs 25 so as to raise carriers 24 until their electrical conducting material 240 is out of contact with a document supported by the base plate 10. When, however, a key lever 26 moves down against its respective holder 23, it depresses the latter, and with it, the respective carrier 24, the whole being given a spiral movement by the coaction of pin 21 with spiral slot 22. When the material 240 strikes the paper or card, the carrier is arrested from further vertical movement and holder 23 continues its downward movement thereby whirling or twisting material 240 so as to deposit a spot of electrical conducting material on the paper, card or document 13. The parts are returned to normal by springs 25 and 243.

The countersinks 18 are arranged so as to bring a respective carrier 24 over each of the respective indicia of a column.

As shown in the drawings, there are thirteen key levers, twelve of which are indicated by the reference numeral 26, and the thirteenth of which is indicated by reference numeral 27. All of the key levers are mounted on a pivot rod 28 carried by upwardly projecting ears 29 on the carriage frame and extend toward the right end of the machine as shown in Fig. 1. Each of the key levers 26 passes over a respective holder 23 and is adapted to depress the head thereof when the respective key button 29 is depressed. The key lever 27 does not pass over any countersink 18 or holder 23 and is used to step the carriage from one column to another where it is not desired to make any mark in the column from which the carriage is being stepped.

Pivoted in bearings in the upwardly projecting portions 30 of the carriage frame is a bar or shaft 31. A portion of this bar between the ends of the same is flattened and receives a trip plate 32 having an upturned front portion 33 extending under all of the key levers 26 and 27. Springs 34 secured at one end to a comb-plate 36 on the carriage frame 14 and at the other end to respective pins extending outwardly from the plate 32, tend constantly to turn the shaft 31 in a counter-clockwise direction as seen in Figs. 1 and 2, so as to bring the lip or flange 33 into close proximity to the key levers 26 and 27. Springs 35 are secured to a comb-plate 36 mounted on the carriage frame, and normally hold the keys 26 and 27 in elevated position. The comb-plate 36 is provided on its lower edge with a plurality of serrations or slots in which the key levers 26 and 27 are guided, and the upper ends of these slots limit the upward movement of the key levers.

It is obvious that when any of the key levers 26 or 27 is rocked by depressing the respective key button 29, it will engage the flange 33 and rock the shaft 31. This shaft 31 is attached to an escapement mechanism, which will presently be described, and at each rocking of the shaft the carriage will be permitted to move one columnar space, thereby bringing the marking instrumentalities 240 from cooperative relation with one column of the card 13 to cooperative relation with the next adjacent column of the card.

The carriage is provided with an anchor element 37 to which is attached one end of a tape 38 which passes over an idler 39 and is secured to the spring-drum 40 as shown in Figs. 1 and 2. The tendency of spring 40, is therefore, to draw the carriage from left to right as seen in Figs. 1 and 2.

Mounted on the side of the machine is a gear rack 42, the teeth of which mesh with a gear pinion 43 rotatable on a stub shaft or stud 44 secured to the side of the carriage frame. Secured to the pinion 43 is a spacing collar or hub 45 and a ratchet wheel 46. The members 43, 45 and 46 are permanently secured together so as to move as a single unit. As shown in Fig. 5, the ratchet wheel 46 is normally engaged with a pawl or dog 47 loosely mounted on shaft 31 and retained in engagement with the ratchet wheel by a spring 48. Secured on the shaft 31, so as to move therewith, is a secondary ratchet pawl 49 having a finger 50 adapted to engage a pin 51 on the pawl 47.

When a key is depressed so as to turn the bar 31 counter-clockwise, as seen in Fig. 5, the pawl 49 has its tooth brought into the path of movement of the teeth on the ratchet wheel and its finger 50 by engagement with pin 51 lifts the pawl 47 until it is disengaged from the ratchet wheel 46. The ratchet wheel now turns slightly under the impulse of spring 40 until the advancing tooth thereof is engaged by the pawl 49. When the key is released and the bar 31 is permitted to return to normal under impulse of its springs 34, Fig. 1, the pawl 47 again moves into the path of movement of the teeth on the ratchet wheel 46 and the pawl 49 is withdrawn from engagement with the ratchet wheel. The ratchet wheel now advances until the next succeeding tooth engages the pawl 47. The purpose of the loose connection between the pawls is to permit engagement of the pawl 47 with a relatively high part of one of the teeth on the ratchet wheel 46 during its return movement, so that the pawls move as a unitary piece during depression of the keys, but may move separately according to their requirements

upon the release of the keys; and also to permit the pawl 47 to idle during movement of the carriage toward the left of the machine as viewed in Fig. 1. This will be readily understood by those versed in the typewriter and calculating machine arts.

The operation of the machine as shown in Figs. 1, 2, 3, 4 and 5 is as follows: A card is placed on the bed plate 10 and within the confines of the guides 11 and 12 and then the carriage is pushed to the left, this being permitted by the loose connection between the escapement pawls. When the carriage has been returned to the left-most column, or for that matter, to any desired column, the operator then depresses the keys 29 corresponding with the data which he wishes to record on the card. Upon the depression of a key the respective marking instrumentality 240 is depressed with a twisting motion so as to apply a spot of electrical conducting material on a portion of the column on the card which portion corresponds with the key depressed. Upon the depression of the key the flange 33 has been engaged by the respective key lever and caused to rock the shaft 31 thereby bringing the pawl 49 into engagement with the ratchet wheel 46 and the pawl 47 out of engagement with the ratchet wheel 46 and permitting a very slight movement of the carriage. As the key is released the pawl 49 returns to normal and the pawl 47 engages the top of the tooth with which it was previously in engagement and rides on the same, while the ratchet wheel 46 advances under impulse of spring 40 until the pawl 47 engages the abrupt face of the next succeeding tooth. In this manner, the carriage is advanced from one column to another of the card and the data is indicated on the card. When a column is reached in which no data is to be indicated, the space key is depressed merely operating the shaft 31 to effect escapement of the carriage. If it is desired to make a plurality of spots or marks in one column on the document, the required keys are simultaneously depressed.

In the alternative form which I show in Figs. 6 and 7, I have provided a ribbon 60 mounted on spools 61 carried by the carriage and guided suitably under all of the marking plungers 63 which are held in the respective countersinks and are pressed upwardly by springs 64. The ribbon is impregnated with electrical conducting material in such manner that when a plunger 63 is depressed by one of the key levers 26 a spot of electrical conducting material will be transferred from the ribbon to the card. Suitable feed and reverse mechanism may be provided for the ribbon and may be of any type common and well known in the arts. Such mechanisms are very well known in the typewriter and calculating machines arts. Except for the simplified marking plungers which are one-piece, and the use of a ribbon, this form of machine is constructed and operates in precisely the same manner as the form shown in Figs. 1, 2, 3, 4 and 5.

It will be readily understood that the card could be mounted on a carriage and moved with relation to the marking instrumentalities and that various other changes, reversals, and equivalents could be employed without in any sense departing from the spirit of my invention; and I therefore do not limit myself to the exact embodiments herein shown nor to anything less than the whole of my invention as herein disclosed and as hereinafter specifically claimed.

What I claim is:

1. The combination of means for supporting a record, a carriage, means for supporting and moving said carriage transversely of said record, a plurality of holders mounted in said carriage and each formed with a spiral groove, a plurality of pins mounted on said carriage and each arranged in a respective one of said grooves, a marking material carrier for each of said holders and mounted in such manner as to be longitudinally movable with relation thereto and to be prevented from rotary movement with relation thereto, and means for operating said holders to effect rotary and reciprocating movement of said carriers.

2. The combination of means for supporting a record, a carriage supported for movement with relation to said record supporting means, a plurality of holders mounted in said carriage and each formed with a longitudinal slot and a helical slot, pins mounted on said carriage and each arranged in the helical slot of a respective one of said holders, a plurality of carriers one for each of said holders and arranged in axial alignment therewith, a pin on each of said carriers and extending into the longitudinal slot of the respective holder, and means for operating said holders.

In testimony whereof I affix my signature.

WILLIAM W. LASKER, JR.